

**Work Order ID 72761**

Page 1

Friday, August 12, 2011 1:17:27 PM

Item ID: D212-664-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 8/12/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 8/25/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date: 11-08-12 Tooling:

Date:

Run Start



QC:

Date: SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

Draw Nbr

Revision Nbr

D212-664-141

Rev D (DEO)

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-101 CHG005

Solved 124

CL 11-8-24

110

0.00

Pick Kit  
Packaging

Memo

0.00

Packaging

Packaging

11-8-15

120

0.00



BENDING MACHINE - CROSSTUBES

Memo

0.00

CNC Bend 2

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fv and Folio D212-664-101

D212-664-101 B72761

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries

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Page 2

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Run Start



Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549, using drill table DT8577, set-up towers in hole #7 as per QSI 10

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

JW  
SAD

11-08-16

SAD

11-08-16

W/O:		WORK ORDER CHANGES					
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Page 3

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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150

Crosstubes Chemical Conversion

0.00



HandFXTube

Memo

0.00

Hand Finishing Crosstubes

Chemical Conversion Coat within 24 hours of bending and drilling

SAD 11-08-16

①

160

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

S w/ob/17

④

170

Outsource process - NDT per QSI038 4.1

0.00



Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038  
Issue P/O: 14697  
LPI as per ASTM 1417 Level 2  
Attach copy of NDT results to work order

C&amp;L 11/08/17 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Page 4

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

180

Receive & Inspect for Damage & Mat'l Certs  
Packaging

0.00

Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

CL 11/08/17 ①

190



QC5- Inspect part completeness to step on W/O

0.00

QC

Memo

0.00

Quality Control

Inspect for damage &amp; ensure results are as per Dwg D212-664-141

BT 11-08-17

W/O:		WORK ORDER CHANGES					
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Friday, August 12, 2011 1:17:27 PM



Page 5

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Customer:

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

200



SprayPaint

Spray Painting

Spray Painting per QSI005 4.2  
SprayPaint

0.00

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube as per DEO D212-667-141 with White Imron as per  
QSI 005 4.2

PRIME:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

11-08-19

PAINT:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

11-08-21

85 11-08-21

210



QC

Quality Control

QC14- Inspect Spray Paint

0.00

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

11-08-22 (7)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Friday, August 12, 2011 1:17:27 PM



Page 6

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Cust Item ID:

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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220

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper,  
clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DSI9563 and QSI 015

A/R Proseal 890 Batch: 178234

3- Torque bolts as per dwg

Accept Qty: M Reject Qty: 11 Reject Number: 08 Insp. Stamp: 23 (1)

230

0.00



QC6- Inspect dimensions to drawing

QC

Memo

0.00

Quality Control

S w/08/24(u)

240

0.00



Pick Kit

Packaging

Memo

0.00

Packaging

St 11/8/24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Friday, August 12, 2011 1:17:27 PM



Page 7

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

250



QC

Quality Control

QC4- 100% Inspect kits for completeness

0.00

8/10/24

Memo

0.00

FD

260



Packaging

Packaging

Packaging

0.00

Rev A

Memo

0.00

Identify and pack for shipping as per PPP D212-664-101

11/8/24

270



QC

Quality Control

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

11/8/24

11-08-23  
①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

Friday, August 12, 2011 1:17:33 PM

Page 1

Work Order ID: 72761



Parent Item: D212-664-101



Parent Item Name: Crosstube Fwd

Start Date: 8/12/2011

Required Date: 8/25/2011

Start Qty: 1.00

Required Qty: 1.00

## Comments:

IPP Rev:E 04.02.16 Reformat KJ/DS  
 IPP Rev:F 06-03-29 Remove Coments on Pick List JLM  
 IPP Rev:G 07-04-30 As per Rev C JLM IPP Rev:H  
 11.04.26 inspection strip ecn 11-549 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D212-664-101TRN Manufactured No



Crosstube Turning Detail

B72220

110

Each

1.0000

1

1



① DP 11-8-15

### Location

### Loc Qty

### Loc Code

FG046

1

71645

1

D3595-063-450 Manufactured No



RUBBER CUSHION

230

Each

70.5600

4

4.210526



11-08-23

### Location

### Loc Qty

### Loc Code

LG

70.56

67353

3

68893

6

70113

0.56

71354

61

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Friday, August 12, 2011 1:17:33 PM

Page 2

Work Order ID: 72761

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 8/12/2011

Required Date: 8/25/2011

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Purchased No

220 Each

102.0000

4 4



Clamp(per MIL-DTL-8783C)



11 08 23

## Location

## Loc Qty

## Loc Code

LG

96

113281

0

113282

0

118142

46

118183

50

LG050

6

116264

2

117998

4

D2893-1

Manufactured No

220 Each

0.0000

2 2



2.75 Support

B# 72586



11 08 23

D3428-1

Manufactured No

240 Each

22.0000

1



SP

Placard

## Location

## Loc Qty

## Loc Code

ST053

22

71168

10

72048

12

Purchased No

240 Each

77.0000

4

AN6-35A



SP

BOLT

## Location

## Loc Qty

## Loc Code

ST343

77

117441

2

117872

25

118422

50

Y

Friday, August 12, 2011 1:17:33 PM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Friday, August 12, 2011 1:17:33 PM

Page 3

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Start Date: 8/12/2011

Required Date: 8/25/2011

Start Qty: 1.00

Required Qty: 1.00

AN6-36A

Purchased

No

240

Each

79.0000

4

Bolt

Location

Loc Qty

Loc Code

ST343

79

117441

9

118012

20

118422

50

MS21042L6

Purchased

No

240

Each

310.0000

6

Nut

Location

Loc Qty

Loc Code

ST300

310

117677

200

118078

10

118384

100

AN960JD616

NAS1149D0663J

Purchased

No

240

Each

0.0000

18

Washer

Friday, August 12, 2011 1:17:34 PM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

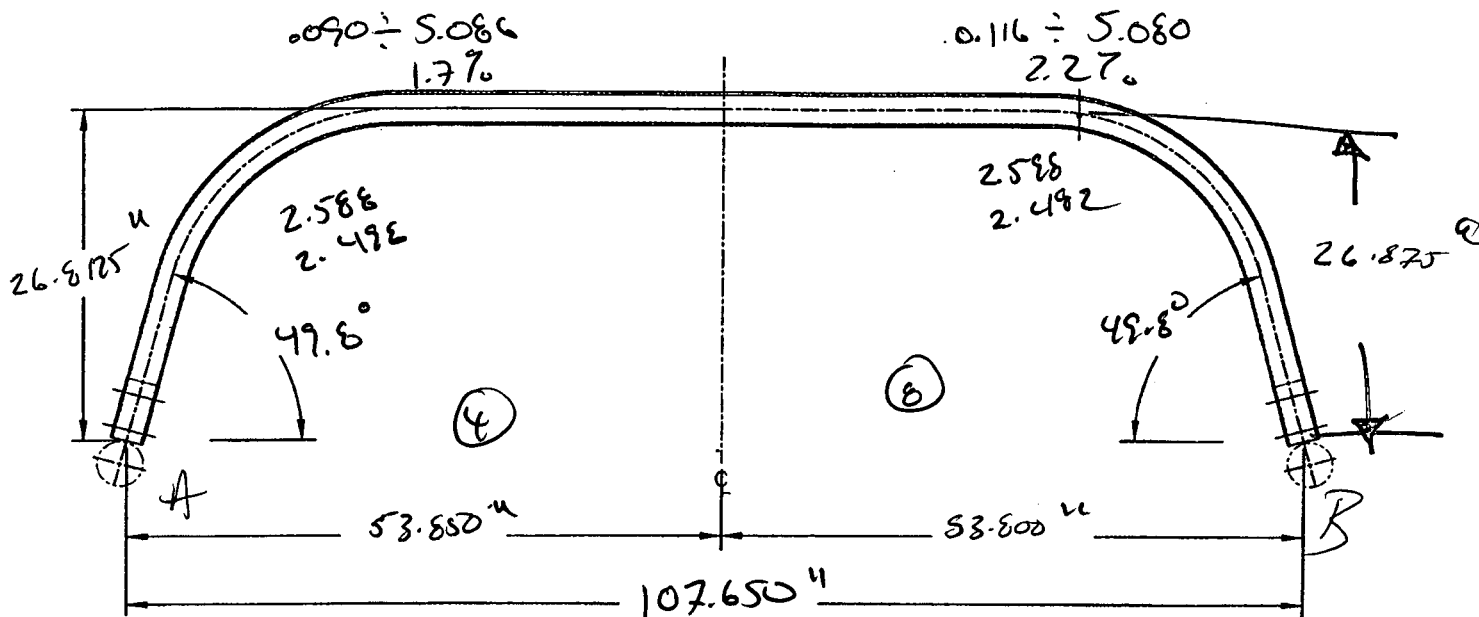
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	72761
<b>Description:</b> Crosstube High Fwd (205/212/412)	<b>Part Number:</b>	D212-664-101
<b>Inspection Dwg:</b> D212-664-141	<b>Rev:</b> D	<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments	
S. Dr A2	1.7% crushing @ 7 Passes
S. Dr B2	2.2% crushing @ 8 Passes

QC15 Inspection	S
Date	11/02/15

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	
C	10.04.01	Dwg Rev updated	KJ	

8 7 6 5 4 3 2 1



Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

**GENERAL NOTES:**

- MATERIAL: MANUFACTURED FROM D6005-128  
FINISHED LENGTH = 126.514±0.020
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS
- WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)  
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS  
6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF  
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER  
INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE  
SUPPORT.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE  
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR  
DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND  
MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT  
HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 72261

*PH 08-12*

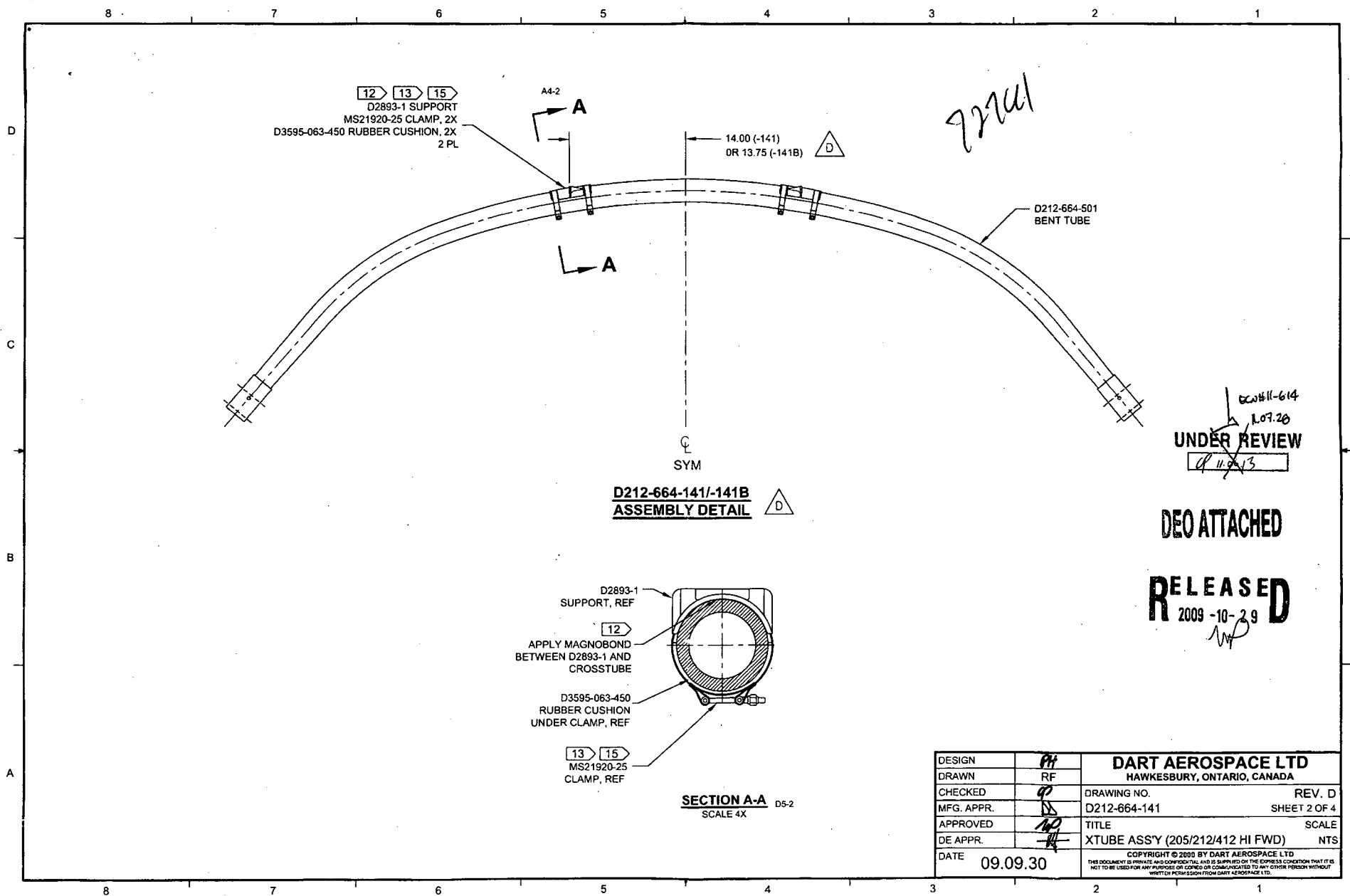
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UNDER REVIEW EGN 11-614  
FOR PROTECTIVE SEALING SUPPORT  
21.07.26

DEO ATTACHED

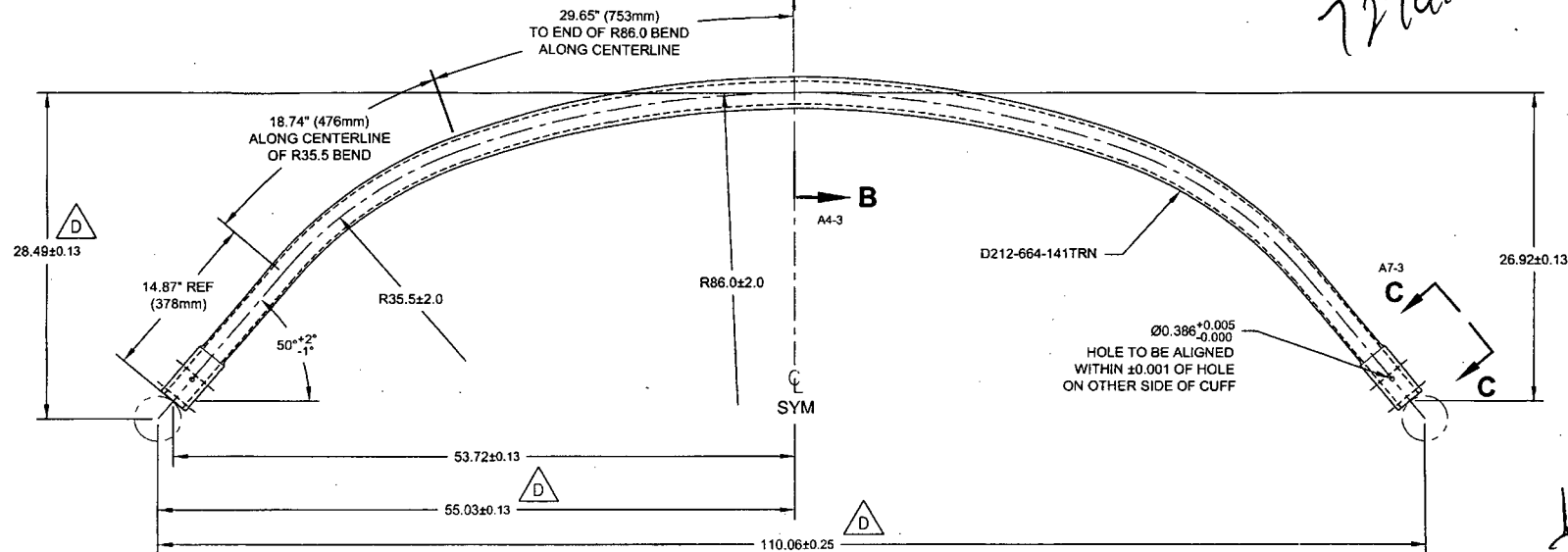
RELEASED  
2009-10-29  
M

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR C3-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE, TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>PH</i>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	<i>PH</i>	DRAWING NO.	REV. D
MFG. APPR.	<i>PH</i>	D212-664-141	SHEET 1 OF 4
APPROVED	<i>PH</i>	TITLE	SCALE
DE APPR.	<i>PH</i>	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

8 7 6 5 4 3 2 1



DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. D
MFG. APPR.	DS	D212-664-141	SHEET 2 OF 4
APPROVED	PH	TITLE	SCALE
DE APPR.	PH	XTUBE ASSY (205/212/412 HI FWD)	NTS
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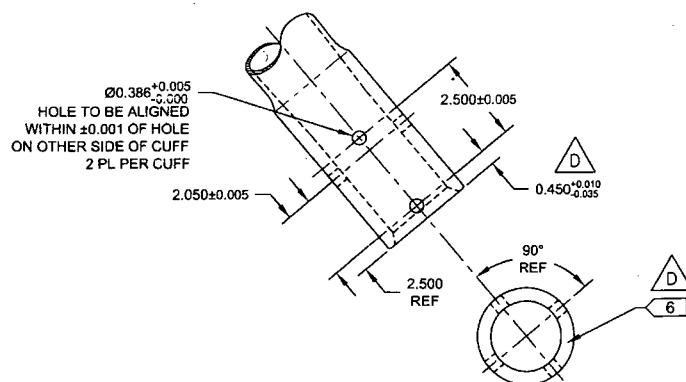
**D212-664-501**  
**BENDING AND DRILLING DETAIL**



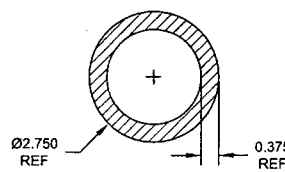
UNDER REVIEW  
11/09/30

DEO ATTACHED

RELEASED  
2009-10-29



**VIEW C-C: CUFF DETAIL**  
SCALE 3X

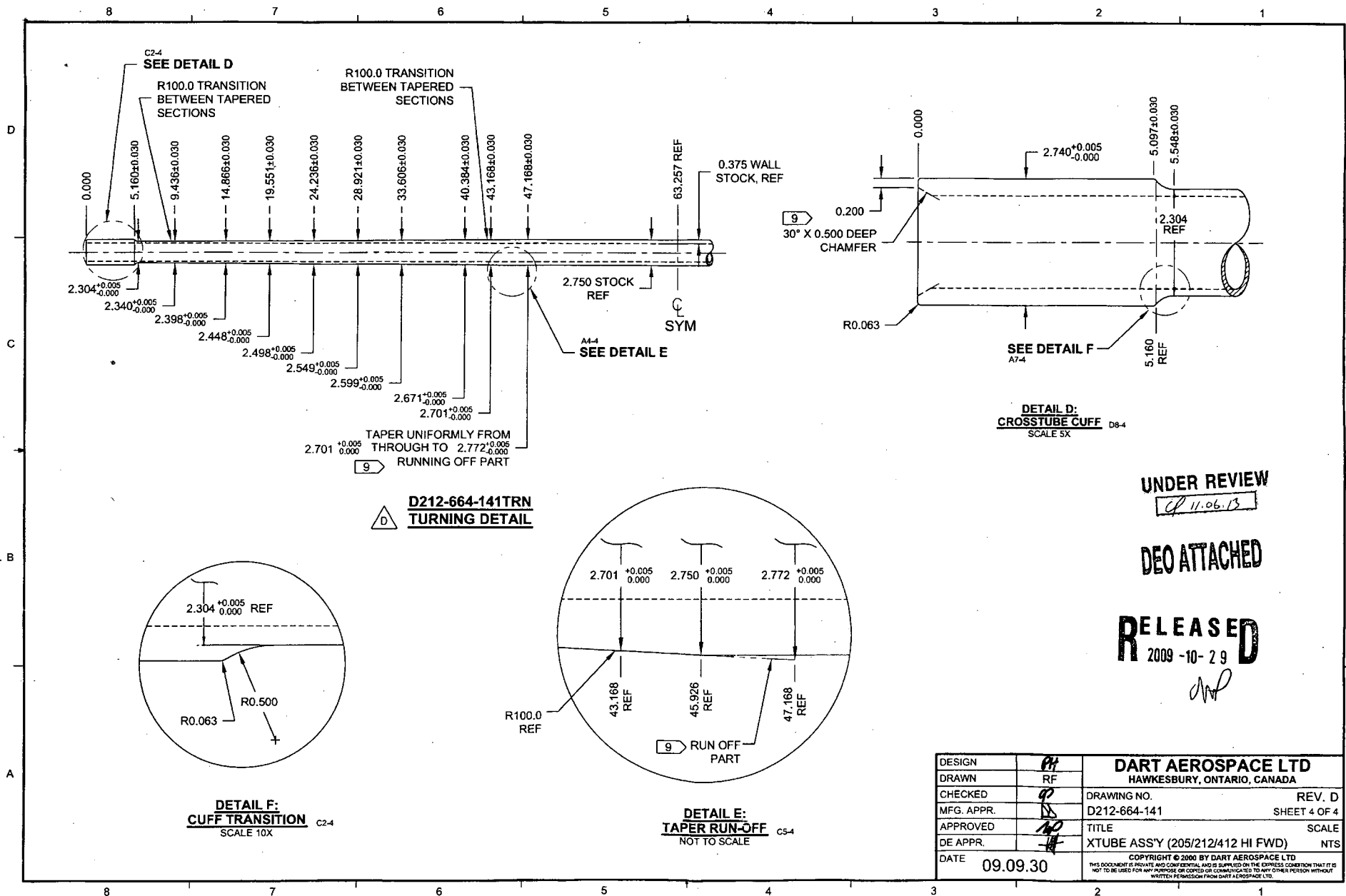


**SECTION B-B**  
SCALE 4X

DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	QP	DRAWING NO.	REV. D
MFG. APPR.	JS	D212-664-141	SHEET 3 OF 4
APPROVED	HP	TITLE	SCALE
DE APPR.	CH	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
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7276



DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. D
MFG. APPR.	DS	D212-664-141	SHEET 4 OF 4
APPROVED	AP	TITLE	SCALE
DE APPR.	TH	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	MP	MFG. APPR.	RE	APPROVED	MP	DE APPR.
DATE 11.04.07	DATE 11.07.11		DATE 11.04.12		DATE 11/04/12		DATE 11.04.12

**PURPOSE:**

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

**CHANGE:**

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

**IS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND  
PAINT OUTSIDE PER DART QSI 005 4.2  
REMOVE MASKING AND APPLY CLEAR COAT

**WAS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2

**RELEASED**  
2011-04-18

**UNDER REVIEW**

14/06.13  
12/11-614  
11.07.28

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DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>	D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN	CHECKED <i>CP</i>	MFG. APPR. <i>CE</i>	APPROVED <i>WAP</i>	DE APPR. <i>WAP</i>		
DATE 11.04.07	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

IS:

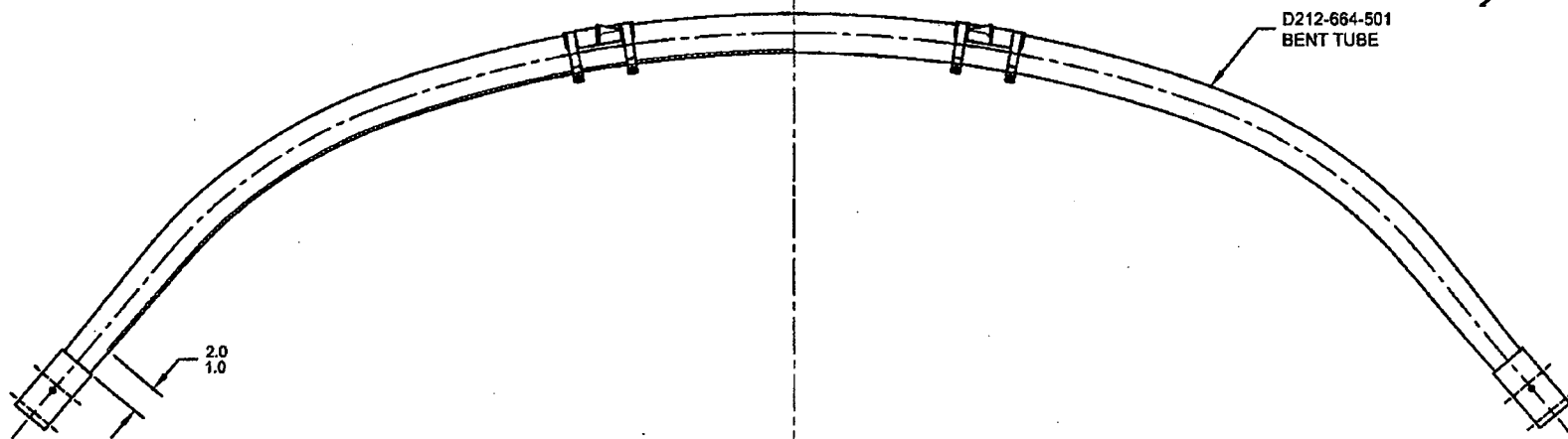
WAS:

**UNDER REVIEW**

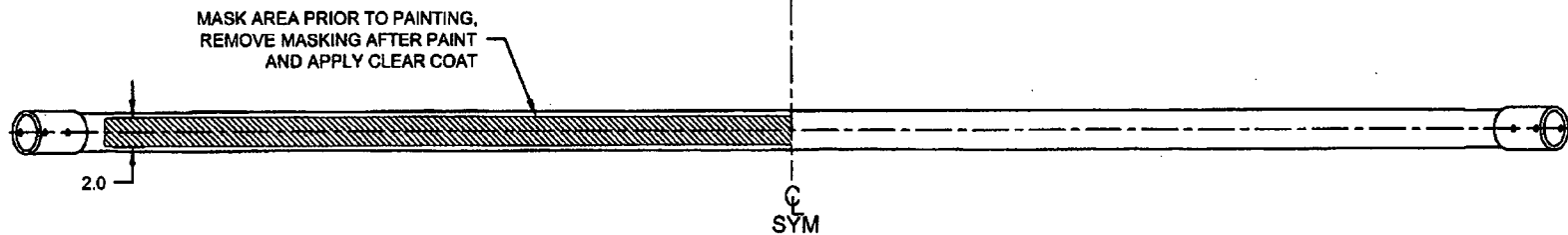
*CP 11/06/13*

*ECN# 11-614*

*11.07.28*



**D212-664-141/-141B  
ASSEMBLY DETAIL**



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DRAWING NO. D212-664-141	TITLE CROSSTUBE ASS'Y (205 HI FWD)	REV. D	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>	D.E.O. NO. D212-664-141-D-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>UP</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>AS</i>	APPROVED <i>MD</i>	DE APPR. <i>MD</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21	DATE 11.07.21		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL.

**CHANGE:**

**IS:**

Item	Qty -141	Qty -141B	Part Number	Description
7	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

**WAS:**

7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
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NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

**IS:**

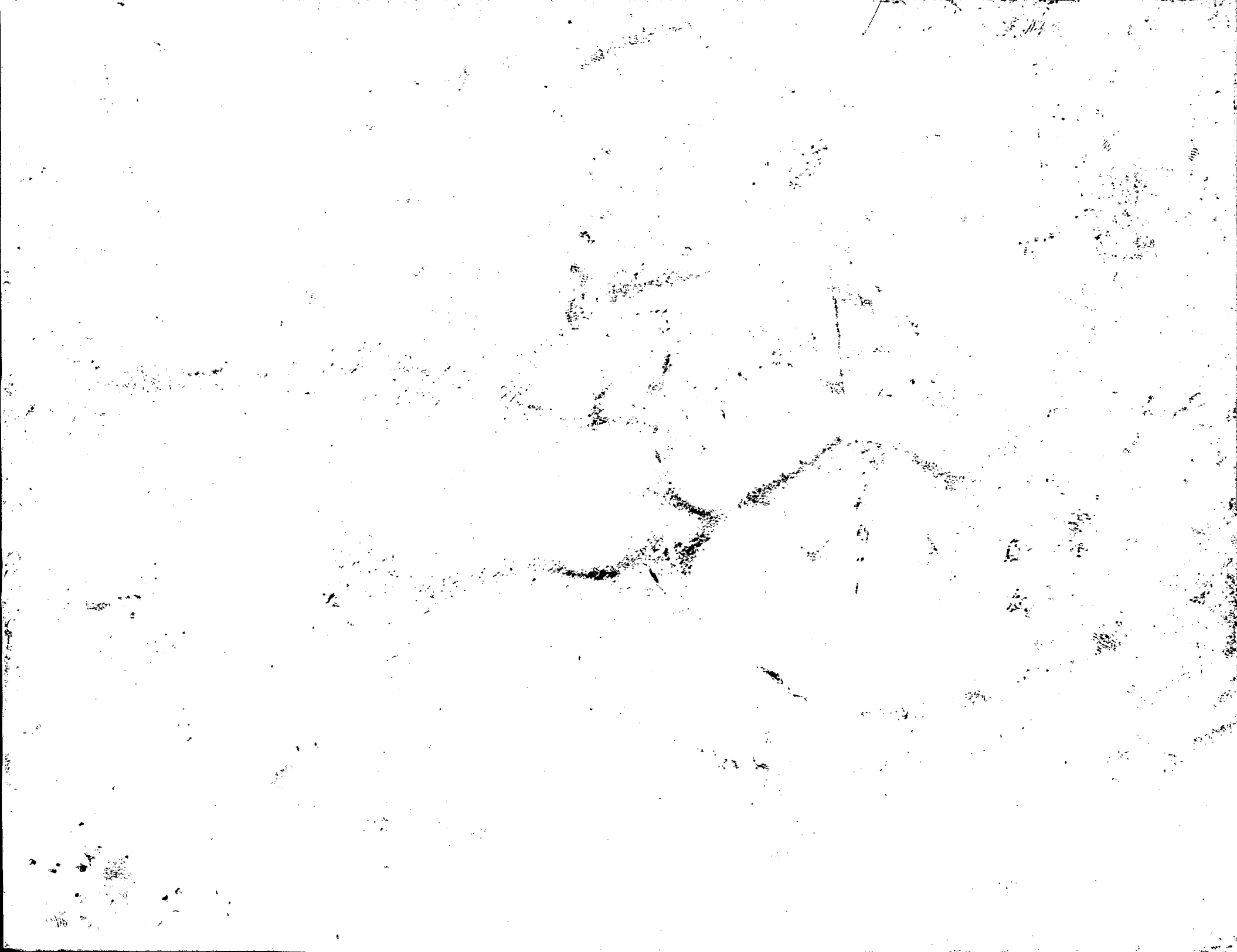
- 12) TO INSTALL D2893-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

**WAS:**

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

*42741*

**RELEASED**  
2011-07-28





ACUREN

## LIQUID PENETRANT TEST REPORT

P- 05100

PAGE 1 OF 1

CLIENT

DART AEROSPACE

DATE

August 17<sup>th</sup> 2011

ATTENTION

LINDA LACELL

ACUREN JOB NO.

158-11-02343

ADDRESS

1270 ABERDEEN RD

PO/NO.

14697

WORK LOCATION

Shop

HAWKESBURY, ONT

ACCEPTANCE STD. ASTM 1417/QSI-038 REV./DATE 2005

PROJECT

PT WET FLUORESCENT ON 8 CROSSTUBES

ITEM(S) EXAMINED

8 CROSSTUBES AS LISTED BELOW

OB DESCRIPTION

PROCEDURE NO. LT-002 REV./DATE 2008

TECHNIQUE NO. LT-002 REV./DATE 2008

PART NO.

LISTED BELOW

MATERIAL

ALODINE ALUMINUM THICKNESS

SCOPE

PERFORMED A WET FLUORESCENT L.P.T. ON 100% OF THE EXTERNAL SURFACE ON ALL ITEMS LISTED BELOW

## TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
AMILY BRAND	MAGNAFLUX		BLACK LIGHT S/N	13778	
ENETRANT	2L-67	MINIMUM DWELL TIME	30	MIN.	
ENETRANT REMOVER	H <sub>2</sub> O	MINIMUM DRY TIME	>10	MIN.	
DEVELOPER	SKD 32	MINIMUM DWELL TIME	10	MIN.	
DEVELOPER TYPE	<input type="checkbox"/> NON AQUEOUS	<input checked="" type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		
			OTHER		
			LIGHT METER S/N	N/A	
			CAL DUE DATE	Aug/30/2011	

## TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS- (☐ METRIC ☐ IMPERIAL)

1	W.O	71753	✓
2	W.O	71749	✓
3	W.O	71750	✓
4	W.O	72761	✓
5	W.O	72760	✓
6	W.O	72716	✓
7	W.O	72679	✓
8	W.O	72678	✓

ITEM: 1 D407-667-105

2 D212-664-101

3 D212-664-101

4 D212-664-101

5 D212-664-101

6 D212-664-101

7 D212-664-101

8 D212-664-101

NO RELEVANT INDICATIONS DETECTED  
AT THE TIME OF INSPECTION

BT 11-08-17

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

in performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE

PRINT  
Linda Lacey

SIGNATURE  
[Signature]

DTR #

TECHNICIAN (SIGNATURE):

SIGNATURE  
[Signature]

REPORT

REVIEWED BY:

NAME (PRINT):

SEBASTIEN DAULT

NAME

INITIALS

1<sup>ST</sup> TECHNICIAN  
CGSB LEVEL II SNT LEVEL  
CGSB REG. NO 12959

2<sup>ND</sup> TECHNICIAN  
CGSB LEVEL SNT LEVEL  
CGSB REG. NO

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT Sept 2005